

## AMENDMENTS TO THE SPECIFICATION

Please amend paragraph 0036 as indicated below:

[0036] The substrate support plate 114 can also be a wafer handler 114 configured to move the wafer in and out of the reaction chamber in the direction indicated by the arrow 134. The wafer handler can be configured to receive the wafer 130 in such a way that the wafer 130 touches the handler itself. Alternatively, the wafer handler can operate on the Bernoulli principle, whereby jets of inactive gas produce a low-pressure zone between the handler and wafer. In a Bernoulli configuration the wafer can be held on top or on the bottom of the handler. If the support is a handler configured to support the substrate upside-down, the showerhead assembly described herein can be simply inverted and placed below the substrate. The handler can thus itself be a robot end effector and can thus be configured to move horizontally as well as vertically, but in the illustrated embodiment is more preferably configured to exchange a wafer with a separate robot end effector when the handler is lowered relative to the reaction chamber 142. While configured in the illustrated embodiments as a vertically movable substrate support to facilitate loading and unloading substrates between depositions, the handler preferably keeps the substrate 130 stationary relative to the gas exchange plate 116 during operation.

Please amend paragraph 0037 as indicated below:

[0037] In the illustrated reactor 100 of FIG. 1, a gas direction system is provided. The gas direction system includes a gas exchange plate 116, a gas exhaust plate 118 and a top plate 120. The gas exchange plate 116 is situated for example about 10 – 60 mm above the growth surface of the substrate 130 during a deposition process. Generally, according to a preferred embodiment at least two gas inlets are fluidly connected to appropriately spaced in-feed apertures via a series of passages that have been machined into the gas exchange plate 116. The gas exchange plate 116 supplies at least two precursors, A and B, and inactive purge gas from gas inlets 158, 159 through main (or first and second passages) passages 148, 149 (see also FIGS. 3-5), the distributor passages (or first and second distributor passages) 150, 154 and respective in-feed (or first and second apertures) apertures 152, 156 into the reaction space 142. The in-feed apertures 152, 156 of gas exchange plate 116 face the deposition side of the substrate 130.

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Further, precursor vapors and inactive purge gas are removed from the reaction space 142 through exhaust apertures 157 of the gas exchange plate 116. The exhaust (or third) apertures 157 are preferably interspersed with the reactant in-feed apertures 152, 156, distributed across the gas exchange plate 116. Thus, the showerhead arrangement defines a gas injection system and the exhaust apertures 157 define a gas exhaust flow path through the gas injection system, among the gas injection apertures 152, 156. U.S. patent application No. 10/428,207, filed April 29, 2003, incorporated herein by reference and from which priority is claimed, discloses other gas injection structures, formed with spaced tubes rather than showerhead plates, in which the gas exhaust flow path through the plane of and interspersed among the gas injection apertures.

Please amend paragraph 0039 as indicated below:

[0039] The gas exhaust plate 118 is positioned against the gas exchange plate 116 so that main passages 148, 149 and distributor passages 150, 154 (which are formed by surface grooves or recesses in the illustrated embodiment) are sealed against the gas exhaust plate 118 from the top side of the passages. Thus, gases enter the gas exchange plate 116 through the inlets 158, 159 that are connected to the feed-through ports 106 of the vacuum chamber 101 and the gases can exit the gas exchange plate 116 only through the in-feed apertures 152, 156 into the reaction space 142. Gases can exit the reaction space 142 only through the exhaust apertures 157 of the gas exchange plate 116. The exhaust apertures 157 are aligned with corresponding exhaust apertures 170 of the gas exhaust plate 118 so that gases can flow only from the reaction space 142 through the aligned apertures 157, 170 into a gas exhaust space 119 of the gas exhaust plate 118.

Please amend paragraph 0040 as indicated below:

[0040] Regarding the position of the gas exhaust space 119, when the top plate 120 is pressed against the gas exhaust plate 118 with sealing surfaces 172, a high-conductivity exhaust space 119 is formed between the gas exhaust plate 118 and the top plate 120. The gas exhaust space 119 is in fluid communication with exhaust conduits 174 and it guides the exhaust gases from the exhaust apertures 170 to the exhaust conduits 174 that are attached to an exhaust feed-through port 110 of the vacuum chamber 101, and further to an exhaust line 180 and a vacuum pump 182. The vacuum pump 182 has an outlet or gas outlet 184 for expelling compressed gases

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from the pump. Alternatively, the exhaust feed-through port 110 can communicate with a venturi for the same effect.

Please amend paragraph 0052 as indicated below:

[0052] Also machined within the gas exchange plate 116 is the plurality of exhaust apertures 157. The exhaust apertures 157 extend from the first (passage) side 550 of the gas exchange plate 116 to the second (reaction space) side 552, allowing gas to travel from one side of the gas exchange plate 116 to the other. As shown in FIG. 5, the exhaust apertures 157 are interspersed with the distributor passages 150, 154 on the gas exchange plate 116 at positions where neither the main passages 148, 149 nor the distributor passages 150, 154 reside, such that the exhaust apertures 157 are isolated from the gas flow paths (or first and second flow paths) defined by the passages 148, 149, 150, 154 and the in-feed apertures 152, 156. One of the benefits related to such an arrangement is that any gas leak from the distributor passages 150, 154 in the horizontal direction on the top side 550 is consumed by nearby exhaust apertures 157, so that the gas flow rakes or passage networks 302, 304 are effectively isolated from each other. Thus, the description herein of the apertures 152, 156, 157 being “isolated” from one another does not exclude indirect communication of leaked gases, *e.g.*, from imperfect sealing of the gas exhaust plate 118 over the surface groove passages of the gas exchange plate 116.

Please amend paragraph 0053 as indicated below:

[0053] Next, holes or bores 508, 509 for attaching the gas inlets 158, 159 are drilled into the side of the gas exchange plate 116. After these machining steps it is beneficial to planarize or polish both sides of the gas exchange plate 116 so that it can be sealed tightly against the substrate support plate (114 in FIG. 1) and the gas exhaust plate (118 in FIG. 1).